REMARKS

This letter is responsive to the office action dated January 15, 2004. Claims 1-29 remain in this application. Claim 11 has been cancelled. Claims 1, 3, 9, 10, 12, 20, 24 and 29 have been amended. The Applicant submits that each of claims 1-10 and 12-29 is now in condition for allowance.

35 U.S.C. § 101 rejection

In paragraph 1 of the office action, the Examiner rejects claims 1-19 and 24-29 as having no connection to the technological arts, indicating that none of the steps indicate any connection to a computer or technology. The Applicant notes that the methods of claims 1, 24, and 29 are computer-implemented, as claimed. However, for greater clarity, claims reciting a database in which instrument risk values are stored have been amended to clarify that the database resides on at least one computer, and claims reciting an aggregation engine used to produce desired risk metrics have been amended to clarify that the aggregation engine is executing on at least one computer.

35 U.S.C. § 103 rejection

In paragraph 2 of the office action, the Examiner has rejected claims 1-10, 15-16 and 18-29 as being unpatentable over **Dembo** (U.S. Patent No. 5,148,365) in view of both **Moore et al.** (U.S. Patent No. 5,446,885) and **Tull, Jr. et al.** (U.S. Patent No. 6,062,056). Furthermore, the Examiner has rejected claims 11-14 as being unpatentable over **Dembo** and **Moore et al.**, and further in view of **Ohata et al.** (U.S. Patent No. 5,864,857).

The Applicant has amended the independent claims of record to explicitly provide that the scenarios in the context of the present invention are time-valued scenarios, and further that first instrument risk values produced for each financial instrument for each scenario and for each time interval are stored in a database organized as a multi-dimensional structure, wherein one axis of the structure represents financial instruments, another axis of the structure represents scenarios, and another axis of the structure represents time, and wherein at least one first instrument risk value associated with the respective financial instrument, scenario, and time interval are stored in the structure. At least a subset of the instrument risk values stored in the database comprises mark-to-future values. For ease of exposition, this database with the foregoing claimed properties is referred to as an "**instrument/scenario/time database**" in these Remarks.

It is respectfully submitted that the use of the instrument/scenario/time database to store instrument risk values to facilitate the computation of risk metrics is novel and inventive in the field of financial risk management. In this regard, the claims have also been amended to clarify that the desired risk metrics produced are used for the purposes of performing risk management of a portfolio of instruments.

Support for this amendment can be found in original claim 11, now cancelled, and throughout the specification, at page 10 lines 1-22, and page 11 lines 1-13, for example.

The Applicant respectfully submits that the combination of elements recited in the amended claims would not be considered obvious by a person skilled in the art in view of the cited references, taken alone or in combination, for the reasons provided below.

First, **Dembo** ("the '365 patent") does not specifically teach a scenario-based risk management system in which instrument risk values at each scenario and for each time interval are determined and stored in an instrument/scenario/time database, which are subsequently summed to produce aggregated risk values for a portfolio of interest, and where the aggregated risk values are then used to compute desired risk metrics. The '365 patent, also owned by the Applicant but filed in August 1989, presupposes the existence of a risk management system, but does not explicitly teach a system which determines and stores, in an instrument/scenario/time database, instrument risk values, including mark-to-future values, at each scenario and time interval, for subsequent summation by an aggregation engine to produce desired risk metrics as is claimed in the present application.

The '365 patent specifically relates to the generation of optimal scenario sets, and in that sense, the patent does relate generally to scenario-based risk management systems, as do the known risk management systems discussed in the Background of pages 1-3 of the Applicant's specification. However, such known risk management systems do not provide the capability to determine and store instrument risk values at each scenario and time interval in an instrument/scenario/time database, that can be subsequently summed by an aggregation engine to produce desired risk metrics as claimed in the present application. This may be attributed to the fact that in the past, it had been widely accepted that risk management of portfolios could only be performed by analyzing portfolios in their entirety, because the interactions between instruments in the portfolio were perceived to be too complex. If a subset of the portfolio were to be analyzed, or if the portfolio were to undergo changes, risk analysis would be re-performed on the entirety of the subset or the changed portfolio. It was generally understood in the field of financial risk management that it was necessary to re-perform the analysis in this manner, in order to ensure

that the complex co-dependencies between the instruments in the given subset or changed portfolio would be captured. Since it was considered necessary to recalculate risk values for each subset or changed portfolio, there was no incentive to store information such as mark-to-future values or risk factor values, at the instrument, scenario, and time level, for use in future analysis.

These observations are consistent with the Examiner's remarks at pages 6-7 of the office action, in which the Examiner notes that the '365 patent does not explicitly disclose the following claimed features, for example: applying a selected set of scenarios to a set of financial instruments to produce at least one instrument risk value for each financial instrument, for each scenario, and for each time interval; storing instrument risk values produced in a database; for a portfolio of financial instruments, producing a desired risk metric; and the production of the desired risk metric is performed by at least one aggregation engine adapted to retrieve the stored instrument risk values, sum the retrieved instrument risk values to produce aggregated risk values, and compute desired risk metrics using the aggregated risk values.

The Examiner proceeds to cite **Moore** ("the '885 patent") in rejecting the claims of the present application, suggesting that at least features are disclosed in that reference. The Applicant submits that the claimed invention is clearly distinguishable from the teachings of the '885 patent for the following reasons.

Re: U.S. Patent No. 5,446,885

The '885 patent is directed to a general information management system, and not to a time-valued scenario-based risk management system. It is submitted that general-purpose management information systems such as that described in the '885 patent would not be considered relevant to the present invention by a person skilled in the art, and could not, in any event, be combined with the '365 patent in a manner that would permit a person skilled in the art to arrive at the

present invention. It would appear to the Applicant that the Examiner has confused certain terms used in the '885 patent, with the language used in the amended claims as it would be understood in the field of financial risk management and to persons skilled in the relevant art.

For example, the concept of "rules" in the '885 patent and the concept of "risk value" in the present application are very different. Unlike the risk values referred to in the present application, the '885 patent does not disclose producing "rules" by way of applying scenarios comprising risk factor values for risk factors operated on by models of financial instruments. Moreover, "rules" are not produced for each of a set of scenarios and at each of at least a first and second time interval, as are the risk values as claimed in the present application. Put another way, the "rules" in the '885 patent do not account for risk factors, scenarios, and time. At best, and without conceding this point, a "rule" may be considered roughly equivalent to a pricing function, which is different from a risk value in the risk management field.

Furthermore, at page 15 of the office action, the Examiner states that the system of the '885 patent is "rule-based", and that "it is well known that good software code instructions are methodically written, weather [sic] it is business, finance or engineering". In the Applicant's invention, the risk values stored in the instrument/scenario/time database are not software code instructions. As would be understood by persons skilled in the art, a risk value is a measure of risk for a financial instrument, and accounts for risk factors, scenarios, and time.

As a further example, it appears that the Examiner may be suggesting on page 12 of the office action that the '885 patent discloses the use of "risk factors". The Applicant respectfully submits that the Examiner has misunderstood what a risk factor is in the context of the Applicant's invention, as would be understood by persons of ordinary skill in the art. The '885 patent might arguably be considered to employ a feature analogous to a "risk factor" in the sense of a type of

calculation that groups "instruments" that are of a similar "risk type" (i.e. follows similar "rules"). However, in the context of risk management systems discussed in the Applicant's specification, a risk factor is a time-series of information that contributes to a scenario (e.g. as reflected in (ii) of Claim 1). While the term "risk factor" might be employed in both contexts, clearly, the term relates to two different and unrelated concepts.

As a further example, it appears that the Examiner may be suggesting on page 13 of the office action (re: claim 23) that the '885 patent discloses "risk engines" running in parallel. However, the "risk engine" of the '885 patent and the risk engine as claimed in the present application are not the same. The claimed risk engine is one that determines risk values (e.g. mark-to-future values) in view of risk factor values, scenarios, and time. The "risk engine" of the '885 patent is not a risk factor-based, scenario-based, and time-based engine. At best, the engine of the '885 patent (i.e. the "GRMS") may be considered to perform only mark-to-market pricing, and is not forward looking (see e.g., col. 14, lines 52-55 of the '885 patent). The Applicant respectfully submits that the '885 patent neither teaches nor suggests that the GRMS engine may be modified to account for all of risk factors, scenarios, and time.

Persons skilled in the art, reading the specification and the claims, would understand that "scenarios" refer to time-valued scenarios. This can be further distinguished from the "scenarios" referred to in Moore, which are not time-valued. The claims have been amended in this regard for greater clarity.

It is also observed that the problem addressed by the '885 patent is to allow rules (i.e. formulas) to be stored in a database as objects, so that the stored rules can be easily modified by a user having little or no programming or software expertise (see e.g., col. 1 line 32 – col. 2 line 44). In contrast, the Applicant's invention is generally directed to a risk management system that facilitates reduction of the time to perform analysis on subsets of portfolios or changed portfolios, and which

allows the running of risk engines and aggregation engines, and database contents, to be geographically distributed (see e.g. pp. 14-17 of Applicant's specification). The problems addressed by the '885 patent are very different from the problems addressed by the Applicant's invention.

Moreover, the '885 patent does not disclose the use of an instrument/scenario/time database. The risk values in Applicant's instrument/scenario/time database are not "rules", and are not stored for the purpose of allowing users to easily "modify" them.

Re: U.S. Patent No. 6,092,056

The Examiner also cites **Tull, Jr. et al.** ("the '056 patent") in rejecting the claims of the present application. The Applicant submits that the claimed invention is clearly distinguishable from the teachings of the '056 patent for the following reasons.

The '056 patent is generally directed to a data processing system that evaluates the performance of a financial instrument based on a defined "basket" or grouping of stocks. Input is received from the capital market periodically, to evaluate the performance of the financial instrument and to report its (current) price to customers. In essence, this patent relates generally to the tracking of the current performance of instruments such as index funds.

While the patent does make reference to a "risk evaluation means", in the context of the '056 patent, this refers specifically to a function used to predict the future correlation of selected stocks in the basket with the market valuation (see col. 7, lines 15-30). Persons skilled in the art would not equate such "risk evaluation means" with the risk engine or aggregation engine as claimed in the Applicant's invention.

It is submitted that the data processing system described in the '056 patent would not be considered relevant to the present invention by a person skilled in the art, and could not, in any event, be combined with the '365 and '885 patents in a manner that would permit a person skilled in the art to arrive at the present invention. In particular, the '056 patent neither teaches nor suggests the use of a risk engine that determines risk values (e.g. mark-to-future values) in view of risk factor values, scenarios, and time. The "risk engine" of the '056 patent does not use a risk factor based, scenario-based, and time-based engine. At best, the system of the '056 patent may be considered to perform only mark-to-market pricing, and is not forward looking, as the current value of the instrument (i.e. the current aggregate value of shares as observed by the Examiner at page 10 of the office action) is computed by retrieving the requisite market information. The Applicant respectfully submits that the '056 patent neither teaches nor suggests that the system may be modified to account for all of risk factors, scenarios, and time, and to compute risk values such as mark-to-future values in view of these. Furthermore, the '056 patent does not disclose the use of an instrument/scenario/time database to store risk values, as provided for in the amended claims.

Re: Official Notices

At pages 10-11 of the office action, it appears that in rejecting claims pertaining to a method in which financial instruments are altered in accordance with a proposed transaction, the "examiner takes official notice that he has done many engineering analysis in area of instrument & control, failure mode analysis, risk assessment and procurement of equipment". The Examiner also states at page 10 that "it is well known of one of ordinary skill in the art of statistics and probability math that computing probabilities of events in finite sample is often greatly simplified by use of rules for permutations and combinations". Furthermore, the Examiner states at pages 12-13 that it is "a common practice in business, computer and engineering such as developing tables, checking ID and

password, etc. In communication, control and business multiprocessing (multithreads) are commonly known and all of known operating systems support parallel processing, and it is well known that commonly used NT platform is used by many users (workstations) and users (two, three, ...) can use the same software application at the same time (e.g. WORD)".

In view of the foregoing remarks and the amended claims, it is respectfully submitted that such observations, without admitting the subject matter of such statements as prior art, are not relevant to the patentability of the invention as claimed. As previously submitted, it was generally understood in the field of financial risk management that it was necessary to re-perform analysis of altered portfolios to ensure that the complex co-dependencies between the instruments in the altered portfolio would be captured. Since it was considered necessary to recalculate risk values for each altered portfolio, there was no incentive to store information such as mark-to-future values and risk factor values for example, at the instrument, scenario, and time level, for use in future analysis. Therefore, the prior art did not teach an approach where stored values could simply be combined in simple permutations or combinations, or analyzed using "standard" engineering analysis. In fact, it is submitted that the prior art methodologies consistently taught away from such an approach. Simple linear additive aggregation of instrument risk values in computing aggregate risk values for a portfolio of interest only became possible as a result of the Applicant's invention in providing the instrument/scenario/time database and the associated aggregation engine as claimed.

It is also noted that the assignee of the present invention, through a commercialization of an embodiment of the present invention now known as the "Mark-to-Future framework", was awarded a "Technological Development of the Year" award by Risk Magazine in 2000. The Applicant submits that this should be considered as objective evidence that the present invention was considered

significantly novel and inventive over prior art approaches used in the field of risk management systems by persons skilled in the art.

Nevertheless, should the Examiner maintain his obviousness rejections despite the foregoing remarks, he is respectfully invited to provide an example of prior art disclosing the features purported to be of common knowledge, and to indicate specifically to which of the claimed features such art is relevant.

Re: U.S. Patent No. 5,864,857

As previously noted, the independent claims of record have been amended to explicitly provide that first instrument risk values produced for each financial instrument for each scenario and for each time interval are stored in a database organized as a multi-dimensional structure, wherein one axis of the structure represents financial instruments, another axis of the structure represents scenarios, and another axis of the structure represents time. The Examiner suggests that **Ohata et al.** ("the '857 patent") discloses this feature. We respectfully disagree.

While a multi-dimensional database management system is generally disclosed in the '857 patent, the '857 patent does not disclose a database organized as a structure having one axis representing financial instruments, another axis representing scenarios, and another axis representing time, for storing at least one first instrument risk values associated with the respective financial instrument, scenario, and time interval. Furthermore, the '857 patent does not suggest that the multi-dimensional database described therein can be modified to arrive at the claimed database.

The Applicant's invention is generally directed to a financial risk management system that facilitates reduction of the time to perform analysis on subsets of portfolios or changed portfolios, and which allows the running of risk engines and

aggregation engines, and database contents to be geographically distributed. In contrast, the '857 patent is generally directed to a low-level data retrieval method to speed up data retrieval from a storage medium (e.g. a hard disk) using page indexes. It is submitted that the '857 patent neither relates directly to the field of the Applicant's invention, nor is it reasonably pertinent to the problems with which the Applicant's invention addresses. Moreover, the '857 patent does not provide persons skilled in the art with the motivation to combine its teachings with the '365 patent to arrive at the claimed instrument/scenario/time database for use by the claimed aggregation engine, and even if such motivation could be found, the combined teachings would not be sufficient to lead a persons skilled in the art to arrive at the invention employing the combination of features claimed.

Concluding Remarks

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be some reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the Applicant's disclosure.

In this case, it is respectfully submitted that the cited references fail to teach or suggest all the claim limitations. In particular, the cited references do not teach applying a selected set of time-valued scenarios, each time-valued scenario comprising a risk factor value for each risk factor operated on by models of a selected set of financial instruments at first and second time intervals, to produce instrument risk values to be stored in a database, where at least a subset of the instrument risk values comprises mark-to-future values, where the database is organized as a multi-dimensional structure, with one axis of the structure

representing financial instruments, another axis of the structure representing scenarios, and another axis of the structure representing time, where at least one first instrument risk value associated with the respective financial instrument, scenario, and time interval are stored in the structure, and where the instrument risk values can be summed at each scenario and at each time interval by an aggregation engine to produce aggregated risk values in computing a desired risk metric for a portfolio.

The Applicant also notes that the references cited by the Examiner relate to highly disparate fields, and that persons skilled in the art would not be motivated to combine the references to arrive at the claimed invention, even if all of the claim limitations were found to be disclosed in the collective set of references, which the Applicant's denies.

It is also respectfully noted that based on the Examiner's reasons, if the Examiner were to reject the claims as amended despite the Applicant's arguments, the Examiner would need to rely on at least four of the cited references, namely all of the '365, '885, '056, and '857 patents, to suggest that the combination of features defined in any of the claims of record is obvious. Such necessity to mosaic numerous patent references should be regarded as persuasive evidence that suggests that that the combination of features as claimed is not, in fact, obvious to persons skilled in the art.

It is noted that a number of references were made of record but not relied upon in the current office action. These references have been considered fully, and also do not disclose applying a selected set of time-valued scenarios, each time-valued scenario comprising a risk factor value for each risk factor operated on by models of a selected set of financial instruments at first and second time intervals, to produce instrument risk values to be stored in a database, where at least a subset of the instrument risk values comprises mark-to-future values, where the database is organized as a multi-dimensional structure, with one axis

of the structure representing financial instruments, another axis of the structure representing scenarios, and another axis of the structure representing time, where at least one first instrument risk value associated with the respective financial instrument, scenario, and time interval are stored in the structure, and where the instrument risk values can be summed at each scenario and at each time interval by an aggregation engine to produce aggregated risk values in computing a desired risk metric for a portfolio. U.S. Patent Nos. 6,317,726, 6,078,904, and 5,819,238 relate generally to systems for managing investment assets, and are not time-valued scenario-based risk management systems. U.S. Patent No. 6,278,981 is generally directed to the use of synthetic instruments to facilitate portfolio compression. U.S. Patent No. 5,303,328 relates generally to neural networks systems. The ProQuest article references a RiskWatch system, which is addressed in the Background of the Applicant's specification. None of these references disclose the foregoing features.

In addition to the amended independent claims, minor corrections have been made to dependent claims 3, 9, 10, and 12, to revise the language used therein for greater clarity, or to correct claim dependencies and clerical errors. No new matter has been introduced by these amendments.

Accordingly, the Applicants submit that claims 1-10 and 12-29 as amended are patentable over the cited art for the reasons provided above. Withdrawal of the Examiner's rejection is respectfully requested.

All objections and rejections have been addressed. It is respectfully submitted, therefore, that the present application is now in position for allowance, and a notice to that effect is earnestly solicited. If the Examiner believes that a telephone interview would expedite allowance of the application, he is respectfully requested to contact the undersigned.

Respectfully submitted,

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